



Facility Type	Facility Category	Number of Polygons	Acreage	Percentage of the Project Area
	Habitat Improvement	26	87.15	0.21
	Recreation General	198	3,923.25	9.53
	Subtotal	224	4,010.40	9.74
	Miscellaneous Disturbed	165	647.67	1.57
	Recreation Campground	47	73.07	0.17
	Recreation Day Use	82	99.22	0.24
	Recreation Facilities	21	8.16	0.02
	Recreation Trails	778	87.54	0.21
	Subtotal	1093	915.66	2.22
	Facilities	285	292.69	0.71
	Recreation Boating Facilities	137	80.22	0.19
	Roads	1,137	867.84	2.11
	Subtotal	1,559	1,240.75	3.01
	Total	3,075	6,249.4	15.18



Task 5 Methods-Recreation Use

- Relicensing Study R-9 quantified current levels of recreation use by facility and season





Task 5 Results-Recreation Use

- ▶ Total of about 1.73 million Recreation Days (RDs) in the study area between May 15, 2002, and May 14, 2003
- ▶ Use was split between the 4 month recreation season (56%) and the 8 month off-season (44%)
- ▶ In the recreation season, 59 % of use occurred on the weekdays and 41% occurred on the weekends
- ▶ In the off-season, 64 % of use occurred on weekdays and 36 % occurred on weekends



Task 5 Results-Recreation Use

- ▶ Lake Oroville had the highest daily average number of RDs in both seasons (recreation season: 4,181; off-season: 1,630)
- ▶ All sites had higher daily averages in the recreation season than in the off-season and most had higher daily averages on weekends than on weekdays.



Task 5 Results-Recreation Use

- ▶ The Thermalito Forebay, Thermalito Afterbay, and the Oroville Wildlife Area contain the bulk of the habitat for State and federally listed species within the project area including 18.3 acres of vernal pool invertebrate habitat, 94 acres of valley elderberry longhorn beetle habitat, and 4,280 acres of giant garter snake habitat.
- ▶ Recreation use is currently estimated to average about 1,500 recreation uses per day within the 13,240 acre OWA




Area	Recreation season			Off-season			Combined Seasons Total (Daily Avg.)
	Weekday Total (Daily Avg.)	Weekend Total (Daily Avg.)	Season Total (Daily Avg.)	Weekday Total (Daily Avg.)	Weekend Total (Daily Avg.)	Season Total (Daily Avg.)	
Lake Oroville	314,063 (3,739)	204,409 (5,110)	518,472 (4,181)	256,692 (1,484)	136,019 (2,000)	392,711 (1,630)	911,183 (2,496)
Bidwell Canyon Complex	83,606 (995)	49,759 (1,244)	133,365 (1,076)	58,100 (336)	26,244 (386)	84,344 (350)	217,709 (596)
Loafer Creek Complex	34,108 (406)	29,633 (741)	63,741 (514)	18,346 (106)	7,457 (110)	25,803 (107)	89,544 (245)
Lime Saddle Complex	71,824 (855)	41,212 (1,030)	113,036 (912)	32,417 (187)	16,767 (247)	49,184 (204)	162,220 (444)
Diversion Pool	4,312 (51)	2,743 (69)	7,055 (57)	8,251 (48)	5,297 (78)	13,548 (56)	20,603 (56)
Thermalito Forebay	37,113 (442)	41,124 (1,028)	78,237 (631)	36,722 (212)	20,761 (305)	57,483 (239)	135,720 (372)
Thermalito Afterbay	33,501 (399)	28,333 (708)	61,834 (499)	19,554 (113)	11,980 (176)	31,534 (131)	93,368 (256)
Oroville Wildlife Area	110,483 (1,315)	80,635 (2,016)	191,118 (1,541)	73,974 (428)	53,370 (785)	127,344 (528)	318,462 (872)
Additional Sites within FERC boundary	47,518 (566)	25,412 (635)	72,930 (588)	72,940 (422)	33,335 (490)	106,275 (441)	179,205 (491)
Feather River Fish Hatchery	44,478 (530)	21,412 (535)	65,890 (531)	68,320 (395)	26,185 (385)	94,505 (392)	160,395 (439)
Dispersed Use Sites ²	3,040 (36)	4,000 (100)	7,040 (57)	4,620 (27)	7,150 (105)	11,770 (49)	18,810 (52)
Additional Sites Outside FERC boundary	17,835 (212)	12,293 (307)	30,128 (243)	22,636 (131)	16,381 (241)	39,017 (162)	69,145 (189)
Total for Study Area	564,825 (6,724)	394,949 (9,874)	959,774 (7,740)	490,769 (2,837)	277,143 (4,076)	767,912 (3,186)	1,727,686 (4,733)



Task 6 Methods

- ▶ Direct and indirect habitat loss/conversion was estimated for each type of recreational facility (Final Report SP-T1)
- ▶ Seasonal field evaluations were conducted throughout the study area to identify areas of potential wildlife/recreational conflicts including:
 - Recreational disturbance of nesting bald eagles, peregrine falcons, and Swainson's hawks
 - Off-Road Vehicle (ORV) impacts to vernal pool habitats
 - Seasonal trail use on nesting waterfowl
 - ORV and trail use damage to valley elderberry longhorn beetle habitat (VELB)
 - Watercraft impacts on nesting grebes



	Facility Category	Number of Polygons	Acreage	Habitat Loss Classification
	Habitat Improvement	26	87.15	indirect-low impact
	Recreation General	198	3,923.25	Indirect-low impact
	Transmission Lines	191	76.11	Indirect-low impact
	Cemetery	8	6.49	Indirect-low impact
	Subtotal	423	4,093.00	
	Miscellaneous Disturbed	165	647.67	direct & indirect-moderate impact
	Recreation Campground	47	73.07	direct & indirect-moderate impact
	Recreation Day Use	82	99.22	direct & indirect-moderate impact
	Recreation Facilities	21	8.16	direct & indirect-moderate impacts
	Recreation Trails	778	87.54	direct & indirect-moderate impacts
	Subtotal	1093	915.66	
	Facilities	285	292.69	direct-high impact
	Recreation Boating Facilities	137	80.22	direct-high impact
	Roads	1,137	867.84	direct-high impact
	Subtotal	1559	1,240.75	
	Total	3075	6,249.4	



Task 6 Results-Nesting Raptors

- ▶ Nesting bald eagle, peregrine falcon and Swainson's hawk can be adversely impacted by recreational activity and development.
 - Recreational disturbance early in the nesting cycle can result in nest abandonment.
 - Disturbance of incubating raptors can displace adults and result in breakage or chilling of eggs.
 - Disturbance later in the nesting cycle can induce nestlings to leave the nest prematurely before they are fully capable of flight which serves to reduce nestling survival.
- ▶ To evaluate the potential for recreational disturbance of these sensitive raptors, monthly site visits were conducted at each nest location. Recreational activities in the area were noted as well as any associated disturbance response.



Task 6 Results-Nesting Raptors

- ▶ Existing conservation measures appear adequate at 2 of 3 bald eagle nest territories based on successful reproduction
- ▶ Additional shoreline closure at the third bald eagle nest territory is recommended
- ▶ All three peregrine falcon nest locations are located on cliffs or cliff-like human structures where vertical distance and inaccessibility limit human intrusion.
- ▶ No recreational disturbance was identified at any of the peregrine nest locations



Task 6 Results-Nesting Raptors

- ▶ The single Swainson's hawk nesting location within the project area is located along the Feather River within the OWA.
- ▶ Observations of recreational use near this nest indicate infrequent recreational use
- ▶ Recreational use increased throughout the nesting season with the greatest amount of use observed during the fledging period.
- ▶ No disturbance response was identified by the adults or nestlings and the territory successfully fledged two young during both years of observation indicating that current levels of recreational activity are not impacting reproduction at this location.



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Task 6 Results-ORV Use/Vernal Pools

- ▶ Identified recreational impacts to vernal pool invertebrate habitats are limited to ORV use
- ▶ ORV damage to pools was noted within 57 (22.5 percent) of the delineated pools
- ▶ Off-road vehicle use can damage vernal pools by disruption of overland flow patterns and from direct habitat destruction. The weight of the vehicle can crush or displace fairy and tadpole shrimp when present during the wet season or destroy their cysts in the summer. The compacted soils in the resulting tire ruts are unsuitable for sustainability of the vernal pool ecology, affecting the growth of aquatic plants and algae.



Task 6 Results-Trail Use/Waterfowl Nesting

- ▶ Portions of the Brad Freeman Trail occur within the area actively managed for nesting waterfowl along the northern end of the Thermalito Afterbay.
- ▶ Relicensing stakeholders questioned the compatibility of spring trail use and area management for waterfowl production.
- ▶ Nest density did not increase with increasing distance from the trail. Qualitative observations indicate that distance from the trail did not appear to be as significant a factor in waterfowl nesting density as the availability of adequate nesting cover.



Task 6 Results-Watercraft/Nesting Grebes

- ▶ Recreation use of watercraft including: powerboats, fishing boats, personal watercraft, sailboats, and canoes have been documented to adversely impact waterfowl
- ▶ Waterfowl species which construct floating nests on the surface of the water are most at risk from recreational boating activities.
- ▶ Both Clark's and western grebes are known to nest on the surface of the Thermalito Afterbay.



Task 6 Results-Watercraft/Nesting Grebes

- ▶ Boat based recreation including personal watercraft can adversely impact nesting grebes through:
- ▶ Boat wakes swamping nests resulting in loss of eggs or young
- ▶ Displacement of incubating adults resulting in reduced hatching rates or predation of young or eggs
- ▶ Abandonment of nests
- ▶ Direct mortality associated with ski, propeller, or boat strikes



Task 6 Results-Watercraft/Nesting Grebes

- ▶ A 2004 DFG study indicated that recreational use of the water ski course adjacent the largest grebe colony was disruptive to grebes and that the potential for reduced production through loss of nest, egg, or young was present.
- ▶ However, monitoring of reproduction in the same study indicated that the Thermalito Afterbay grebe colonies had the second highest level of production documented in the Statewide survey at 1.41 young per pair.
- ▶ These data indicate that while recreationally related impacts may occur, they are not significantly reducing grebe production on the Thermalito Afterbay.
- ▶ No recreational closures or relocation of the water ski course are recommended for protection of nesting grebes based on analyses of available data.



Task 7 Methods

- Using the results of Tasks 1 through 6, identify potential measures to minimize recreational impacts to wildlife





Task 7 Results

- We identified 48 measures that have the potential to reduce or eliminate conflicts between current and future recreation use/development and wildlife management objectives within the project area.

These measures include:

- Measures to be considered during citing or construction of additional recreational facilities
- Measures to minimize recreation related impacts to ESA habitats and species
- Measures designed to limit recreation related impacts to wildlife during Operations and Maintenance activities
- Measures designed to increase recreational use of wildlife resources



Measures to be considered during citing or construction of additional recreational facilities

- ▶ Avoid citing or development of recreational facilities within areas mapped as sensitive resource areas.
- ▶ Minimize direct habitat loss during project design and construction
- ▶ Retain screening vegetation to limit indirect habitat loss and wildlife disruption/displacement
- ▶ To the extent possible, restrict construction and associated habitat disturbance to periods outside the primary reproductive period (March through July)
- ▶ Retain key wildlife habitat elements to the extent possible including snags, woody dead and down material, live trees containing cavities, and shrub cover
- ▶ Retain mature trees and minimize use of non-native landscaping
- ▶ Avoid recreational development in riparian or wetland habitats
- ▶ Consider designing recreational developments with physical barriers to limit resource damage in habitats adjacent to high recreation use areas
- ▶ Avoid incompatible recreational uses and developments within the OWA
- ▶ Revegetate areas of disturbed soil



Measures to Minimize Recreation Related Impacts to ESA Habitats and Species

➤ *Bald Eagles*

- Retain seasonal recreation closures in the vicinity of nesting bald eagles
- Maintain signage, patrol, and enforcement of bald eagle nest territory seasonal closures
- Periodically reevaluate the effectiveness of conservation measures designed to minimize recreational impacts to nesting bald eagles
- Conduct annual nest surveys to identify new or previously unknown bald eagle nest territories
- In consultation with USFWS and DFG, develop and implement conservation measures to protect new nest territories from recreational disturbance



Measures to Minimize Recreation Related Impacts to ESA Habitats and Species

- ▶ *Vernal Pools*
- ▶ Retain ORV closures in areas containing vernal pool habitats
- ▶ Maintain or increase signage, patrol, and enforcement to limit ORV use in vernal pool habitats
- ▶ Maintain fences or barriers to ORV use in vernal pool areas
- ▶ Periodically inspect fences and barriers to ORV use and repair as needed
- ▶ Periodically inspect and report on the effectiveness of conservation measures designed to minimize ORV impacts to vernal pool habitats
- ▶ Avoid recreational development, expansion, or use within vernal pool habitats



Measures to Minimize Recreation Related Impacts to ESA Habitats and Species

- ▶ *Valley Elderberry Longhorn Beetle*
- ▶ Avoid recreational development or expansion into areas of valley elderberry longhorn beetle (VELB) habitat
- ▶ Minimize ORV use in areas containing VELB habitat
- ▶ Consider installation of fencing or barriers adjacent to high recreation use areas within VELB habitat
- ▶ Consider additional road closures to limit ORV damage to VELB habitat
- ▶ Periodically reevaluate the effectiveness of VELB conservation measures designed to limit recreational impacts to VELB



Measures to Minimize Recreation Related Impacts to ESA Habitats and Species

► *Giant Garter Snake*

- Avoid recreational developments within giant garter snake habitat
- Provide educational signage at key recreational facilities to limit take associated with the public's "fear of snakes" behaviors
- Limit areas of dog trial training within giant garter snake habitat during the snake's active period (March 1 through October 31)



Measures Designed to Limit Recreation Related Impacts to Wildlife During Operations and Maintenance Activities

- Retain existing seasonal recreation closure in waterfowl nesting areas
- Restrict herbicide use in areas containing vernal pool or VELB habitat
- Abandon and revegetate or surface dirt roads adjacent to vernal pool habitats
- Limit bridge maintenance activities to the period from August 30 through February 1
- Limit to the extent practical, bridge inspections to the period between August 30 and February 1
- Maintain exclusionary fencing and gates on bridge inspection catwalks
- Implement Best Management Practices when conducting earthmoving, grading, levee maintenance, or culvert maintenance in areas containing vernal pools or VELB habitat



Measures Designed to Limit Recreation Related Impacts to Wildlife During Operations and Maintenance Activities

- ▶ Consider seasonal closure or consolidation of recreational use of campgrounds, day use areas, and other recreational facilities during low use periods
- ▶ Maintain and enforce the day use limitation within the OWA (excluding campground locations)
- ▶ Consider a restriction on boat speeds within the portion of the Thermalito Afterbay north of Highway 162 to limit disturbance of waterfowl
- ▶ Improve consultation and coordination between DFG, DWR, and the California Highway Patrol related to "special recreational event" planning at the Thermalito Afterbay and on the OWA.
- ▶ Restrict ORV use within the drawdown zone of Lake Oroville to minimize habitat degradation and wildlife disturbance/displacement



Measures Designed to Enhance Recreational Use of Wildlife Resource

- ▶ Construct four additional waterfowl brood ponds
- ▶ Implement a wood duck nest box program
- ▶ Implement a program to enhance waterfowl and upland game bird forage
- ▶ Implement a program to enhance waterfowl and pheasant nest cover
- ▶ Encourage development of wildlife viewing opportunities
- ▶ Maintain or enhance hunting opportunities on lands administered by DPR and DFG (excluding areas within bald eagle nest territories)
- ▶ Explore opportunities to control populations of non-native wild turkey on DPR lands while providing opportunities for increased sport harvest

Questions ?

